

What is claimed is:

1. A method of controlling roll stability of a vehicle comprising the steps of:

determining a roll angle of the vehicle; and

5 generating a tire moment in response to the roll angle so that a net moment on the vehicle is counter to a roll direction.

2. A method as recited in claim 1 wherein the tire moment approaches a gravity moment.

10 3. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll angle in response to a lateral acceleration.

4. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll
15 angle in response to a lateral acceleration and yaw rate.

5. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll angle in response to a lateral acceleration, vehicle
20 speed and yaw rate.

6. A method as recited in claim 1 wherein determining a roll angle comprises determining a lateral acceleration and a steering velocity.

7. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll angle in response to a roll rate.

5 8. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll angle in response to a vehicle speed.

9. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll angle in response to a yaw rate a pitch angle.

10 10. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll angle in response to a pitch rate.

11. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll
15 angle in response to a pitch angle.

12. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll angle in response to a global positioning system signal.

20 13. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll angle in response to a steering angle.

14. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll
25 angle in response to a steering velocity.

15. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll angle in response to a wheel speed.

16. A method as recited in claim 1 wherein
5 determining a roll angle comprises determining a roll angle in response to a wheel normal load estimate.

17. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll angle in response to a road bank angle.

10 18. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll angle in response to a roll acceleration.

19. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll
15 angle in response to a longitudinal acceleration.

20. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll angle in response to a reference roll angle.

21. A method as recited in claim 1 wherein
20 determining a roll angle comprises determining a roll angle in response to a relative roll angle.

22. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll

angle in response to a road bank angle and a previous roll angle estimate.

23. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll angle in response to a road bank angle and a reference roll angle.

24. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll angle in response to a body roll angle initialization.

25. A method as recited in claim 24 wherein the body roll angle initialization is determined in response to a roll angle estimate and a lateral acceleration.

26. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll angle in response to an instantaneous roll angle reference.

27. A method as recited in claim 26 wherein the instantaneous roll angle reference is determined in response to a vehicle speed, a yaw rate and a lateral acceleration.

28. A method as recited in claim 1 wherein the roll angle estimate is determined in response to a reference roll angle and a body roll integration.

29. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll angle in response to a roll angle estimate.

30. A method as recited in claim 29 wherein the
5 roll angle estimate is determined in response to a reference roll angle and a body roll integration.

31. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll angle in response to a model roll angle.

10 32. A method as recited in claim 31 wherein the model roll angle is determined in response to a chassis roll observer.

33. A method as recited in claim 1 wherein
15 determining a roll angle comprises determining a roll angle in response to a road bank angle time constant.

34. A method as recited in claim 33 wherein the road bank angle time constant is determined in response
20 to a steering velocity, a lateral acceleration and a vehicle speed.

35. A method as recited in claim 1 wherein determining a roll angle comprises determining a roll
25 angle in response to body slip.

36. A method of controlling roll stability of a vehicle comprising the steps of:

determining a roll angle estimate; and

generating a tire moment in response to a roll angle estimate, so that a net moment on the vehicle is counter to a roll direction.

5 37. A method as recited in claim 36 wherein the tire moment approaches a gravity moment.

38. A method as recited in claim 36 determining a roll angle estimate comprises determining a roll angle
10 estimate in response to a lateral acceleration.

39. A method as recited in claim 36 determining a roll angle estimate comprises determining a roll angle
15 estimate in response to a lateral acceleration and yaw rate.

40. A method as recited in claim 36 determining a roll angle estimate comprises determining a roll angle
20 estimate in response to a lateral acceleration, vehicle speed and yaw rate.

41. A method as recited in claim 36 wherein
25 determining a roll angle estimate comprises determining a lateral acceleration and a steering velocity.

42. A method as recited in claim 36 determining a roll angle estimate comprises determining a roll angle
estimate in response to a roll rate.

30 43. A method as recited in claim 36 determining a roll angle estimate comprises determining a roll angle estimate in response to a vehicle speed.

44. A method as recited in claim 36 determining a roll angle estimate comprises determining a roll angle estimate in response to a yaw rate a pitch angle.

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45. A method as recited in claim 36 determining a roll angle estimate comprises determining a roll angle estimate in response to a pitch rate.

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46. A method as recited in claim 36 determining a roll angle estimate comprises determining a roll angle estimate in response to a pitch angle.

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47. A method as recited in claim 36 determining a roll angle estimate comprises determining a roll angle estimate in response to a global positioning system signal.

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48. A method as recited in claim 36 determining a roll angle estimate comprises determining a roll angle estimate in response to a steering angle.

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49. A method as recited in claim 36 determining a roll angle estimate comprises determining a roll angle estimate in response to a steering velocity.

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50. A method as recited in claim 36 determining a roll angle estimate comprises determining a roll angle estimate in response to a wheel speed.

51. A method as recited in claim 36 determining a roll angle estimate comprises determining a roll angle estimate in response to a wheel normal load estimate.

5 52. A method as recited in claim 36 determining a roll angle estimate comprises determining a roll angle estimate in response to a road bank angle.

53. A method as recited in claim 36 determining a
10 roll angle estimate comprises determining a roll angle estimate in response to a roll acceleration.

54. A method as recited in claim 36 determining a roll angle estimate comprises determining a roll angle
15 estimate in response to a longitudinal acceleration.

55. A method as recited in claim 36 wherein determining a roll angle estimate comprises determining a roll angle estimate in response to a reference roll
20 angle.

56. A method as recited in claim 36 wherein determining a roll angle estimate comprises determining a roll angle estimate in response to a relative roll
25 angle.

57. A method as recited in claim 36 wherein determining a roll angle estimate comprises determining a roll angle estimate in response to a road bank angle
30 and a previous roll angle estimate.

58. A method as recited in claim 36 wherein determining a roll angle estimate comprises determining a roll angle estimate in response to a road bank angle and a reference roll angle.

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59. A method as recited in claim 36 wherein determining a roll angle estimate comprises determining a roll angle estimate in response to a body roll angle initialization.

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60. A method as recited in claim 59 wherein the body roll angle initialization is determined in response to a lateral acceleration.

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61. A method as recited in claim 36 wherein determining a roll angle estimate comprises determining a roll angle estimate in response to an instantaneous roll angle reference.

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62. A method as recited in claim 61 wherein the instantaneous roll angle reference is determined in response to a vehicle speed, a yaw rate and a lateral acceleration.

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63. A method as recited in claim 36 wherein the roll angle estimate is determined in response to a reference roll angle and a body roll integration.

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64. A method as recited in claim 36 wherein determining a roll angle comprises determining a roll angle in response to a model roll angle.

65. A method as recited in claim 64 wherein the model roll angle is determined in response to a chassis roll observer.

5 66. A method as recited in claim 36 wherein determining a roll angle estimate comprises determining a roll angle estimate in response to a road bank angle time constant.

10 67. A method as recited in claim 66 wherein the road bank angle time constant is determined in response to a steering velocity, a lateral acceleration and a vehicle speed.

15 68. A method as recited in claim 36 wherein determining a roll angle estimate comprises determining a roll angle estimate in response to body slip.

20 69. A method of controlling roll stability of a vehicle comprising the steps of:
 determining a roll responsive control signal; and
 generating a tire moment in response to the roll responsive control signal so that a net moment on the vehicle is counter to a roll direction.

25 70. A method as recited in claim 69 wherein the tire moment approaches a gravity moment.

30 71. A method as recited in claim 69 wherein determining a roll responsive signal comprises determining a roll responsive control signal in response to a lateral acceleration.

72. A method as recited in claim 69 wherein
determining a roll responsive control signal comprises
determining a roll responsive control signal in
5 response to a lateral acceleration and yaw rate.

73. A method as recited in claim 69 wherein
determining a roll responsive control signal comprises
determining a roll responsive control signal in
10 response to a lateral acceleration, vehicle speed and
yaw rate.

74. A method as recited in claim 69 wherein
determining a roll responsive control signal comprises
15 determining a lateral acceleration and a steering
velocity.

75. A method as recited in claim 69 wherein
determining a roll responsive control signal comprises
20 determining a roll responsive control signal in
response to a roll rate.

76. A method as recited in claim 69 wherein
determining a roll responsive control signal comprises
25 determining a roll responsive control signal in
response to a vehicle speed.

77. A method as recited in claim 69 wherein
determining a roll responsive control signal comprises
30 determining a roll responsive control signal in
response to a yaw rate a pitch angle.

78. A method as recited in claim 69 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a pitch rate.

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79. A method as recited in claim 69 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a pitch angle.

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80. A method as recited in claim 69 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a global positioning system signal.

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81. A method as recited in claim 69 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a steering angle.

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82. A method as recited in claim 69 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a steering velocity.

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83. A method as recited in claim 69 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a wheel speed.

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84. A method as recited in claim 69 wherein determining a roll responsive control signal comprises

determining a roll responsive control signal in response to a wheel normal load estimate.

85. A method as recited in claim 69 wherein
5 determining a roll responsive control signal comprises determining a roll responsive control signal in response to a road bank angle.

86. A method as recited in claim 69 wherein
10 determining a roll responsive control signal comprises determining a roll responsive control signal in response to a roll acceleration.

87. A method as recited in claim 69 wherein
15 determining a roll responsive control signal comprises determining a roll responsive control signal in response to a longitudinal acceleration.

88. A method as recited in claim 69 wherein
20 determining a roll responsive control signal comprises determining a roll responsive control signal in response to a roll angle.

89. A method as recited in claim 69 wherein
25 determining a roll responsive control signal comprises determining a roll responsive control signal in response to a reference roll angle.

90. A method as recited in claim 69 wherein
30 determining a roll responsive control signal comprises determining a roll responsive control signal in response to a relative roll angle.

91. A method as recited in claim 69 wherein
determining a roll responsive control signal comprises
determining a roll responsive control signal in
5 response to a road bank angle and a previous roll angle
estimate.

92. A method as recited in claim 69 wherein
determining a roll responsive control signal comprises
10 determining a roll responsive control signal in
response to a road bank angle and a reference roll
angle.

93. A method as recited in claim 69 wherein
15 determining a roll responsive control signal comprises
determining a roll responsive control signal in
response to a body roll angle initialization.

94. A method as recited in claim 93 wherein the
20 body roll angle initialization is determined in
response to a roll angle estimate and a lateral
acceleration.

95. A method as recited in claim 69 wherein
25 determining a roll responsive control signal comprises
determining a roll responsive control signal in
response to an instantaneous roll angle reference.

96. A method as recited in claim 69 wherein the
30 roll angle signal reference is determined in response
to a vehicle speed, a yaw rate and a lateral
acceleration.

97. A method as recited in claim 69 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a roll angle estimate.

98. A method as recited in claim 69 wherein the roll responsive control signal is determined in response to a reference roll angle and a body roll integration.

99. A method as recited in claim 69 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a model roll angle.

100. A method as recited in claim 99 wherein the model roll responsive control signal is determined in response to a chassis roll observer.

101. A method as recited in claim 69 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a road bank angle time constant.

102. A method as recited in claim 101 wherein the road bank angle time constant is determined in response to a steering velocity, a lateral acceleration and a vehicle speed.

103. A method as recited in claim 69 wherein determining a roll responsive control signal comprises

determining a roll responsive control signal in response to body slip.

104. A method of controlling roll stability of a
5 vehicle comprising the steps of:

determining a vehicle roll condition; and

generating a tire moment in response to the vehicle roll condition so that a net moment on the vehicle is counter to a roll direction.

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105. A method as recited in claim 104 wherein the tire moment approaches a gravity moment.

106. A method as recited in claim 104 wherein
15 determining a vehicle roll condition comprises determining a vehicle roll condition in response to a lateral acceleration.

107. A method as recited in claim 104 wherein
20 determining a vehicle roll condition comprises determining a vehicle roll condition in response to a lateral acceleration and a yaw rate.

108. A method as recited in claim 104 wherein
25 determining a vehicle roll condition comprises determining a vehicle roll condition in response to a lateral acceleration, a yaw rate and a vehicle speed.

109. A method as recited in claim 104 wherein
30 determining a vehicle roll condition comprises determining a lateral acceleration and a steering velocity.

110. A method as recited in claim 104 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
5 roll rate.

111. A method as recited in claim 104 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
10 vehicle speed.

112. A method as recited in claim 104 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
15 yaw rate a pitch angle.

113. A method as recited in claim 104 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
20 pitch rate.

114. A method as recited in claim 104 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
25 pitch angle.

115. A method as recited in claim 104 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
30 global positioning system signal.

116. A method as recited in claim 104 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a steering angle.

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117. A method as recited in claim 104 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a steering velocity.

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118. A method as recited in claim 104 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a wheel speed.

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119. A method as recited in claim 104 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a wheel normal load estimate.

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120. A method as recited in claim 104 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a road bank angle.

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121. A method as recited in claim 104 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a roll acceleration.

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122. A method as recited in claim 104 wherein determining a vehicle roll condition comprises

determining a vehicle roll condition in response to a longitudinal acceleration.

123. A method as recited in claim 104 wherein
5 determining a vehicle roll condition comprises determining a vehicle roll condition in response to a roll angle.

124. A method as recited in claim 104 wherein
10 determining a vehicle roll condition comprises determining a vehicle roll condition in response to a reference roll angle.

125. A method as recited in claim 104 wherein
15 determining a vehicle roll condition comprises determining a vehicle roll condition in response to a relative roll angle.

126. A method as recited in claim 104 wherein
20 determining a vehicle roll condition comprises determining a vehicle roll condition in response to a road bank angle and a previous roll angle estimate.

127. A method as recited in claim 104 wherein
25 determining a vehicle roll condition comprises determining a vehicle roll condition in response to a road bank angle and a reference roll angle.

128. A method as recited in claim 104 wherein
30 determining a vehicle roll condition comprises determining a vehicle roll condition in response to a body roll angle initialization.

129. A method as recited in claim 128 wherein the
body roll angle initialization is determined in
response to a roll angle estimate and a lateral
5 acceleration.

130. A method as recited in claim 104 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to an
10 instantaneous roll angle reference.

131. A method as recited in claim 130 wherein the
instantaneous roll angle reference is determined in
response to a vehicle speed, a yaw rate and a lateral
15 acceleration.

132. A method as recited in claim 104 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
20 roll angle estimate.

133. A method as recited in claim 132 wherein the
roll angle estimate is determined in response to a
reference roll angle and a body roll integration.
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134. A method as recited in claim 104 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
model roll angle.
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135. A method as recited in claim 134 wherein the model roll angle is determined in response to a chassis roll observer.

5 136. A method as recited in claim 104 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a road bank angle time constant.

10 137. A method as recited in claim 136 wherein the road bank angle time constant is determined in response to a steering velocity, a lateral acceleration and a vehicle speed.

15 138. A method as recited in claim 104 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to body slip.

20 139. A method of controlling roll stability of a vehicle comprising the steps of:
 determining a roll angle of the vehicle; and
 applying a brake pressure distribution in response
to the roll angle to prevent the vehicle from rolling
25 over.

 140. A method as recited in claim 139 wherein determining a roll angle comprises determining a roll angle in response to a lateral acceleration.

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141. A method as recited in claim 139 determining a roll angle comprises determining a roll angle in response to a lateral acceleration and a yaw rate.

5 142. A method as recited in claim 139 determining a roll angle comprises determining a roll angle in response to a lateral acceleration, vehicle speed and a yaw rate.

10 143. A method as recited in claim 139 wherein determining a roll angle comprises determining a lateral acceleration and a steering velocity.

15 144. A method as recited in claim 139 wherein determining a roll angle comprises determining a roll angle in response to a roll rate.

20 145. A method as recited in claim 139 wherein determining a roll angle comprises determining a roll angle in response to a vehicle speed.

25 146. A method as recited in claim 139 wherein determining a roll angle comprises determining a roll angle in response to a yaw rate a pitch angle.

 147. A method as recited in claim 139 wherein determining a roll angle comprises determining a roll angle in response to a pitch rate.

30 148. A method as recited in claim 139 wherein determining a roll angle comprises determining a roll angle in response to a pitch angle.

149. A method as recited in claim 139 wherein
determining a roll angle comprises determining a roll
angle in response to a global positioning system
5 signal.

150. A method as recited in claim 139 wherein
determining a roll angle comprises determining a roll
angle in response to a steering angle.
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151. A method as recited in claim 139 wherein
determining a roll angle comprises determining a roll
angle in response to a steering velocity.

152. A method as recited in claim 139 wherein
determining a roll angle comprises determining a roll
angle in response to a wheel speed.
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153. A method as recited in claim 139 wherein
determining a roll angle comprises determining a roll
angle in response to a wheel normal load estimate.
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154. A method as recited in claim 139 wherein
determining a roll angle comprises determining a roll
angle in response to a road bank angle.
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155. A method as recited in claim 139 wherein
determining a roll angle comprises determining a roll
angle in response to a roll acceleration.
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156. A method as recited in claim 139 wherein determining a roll angle comprises determining a roll angle in response to a longitudinal acceleration.

5 157. A method as recited in claim 139 wherein determining a roll angle comprises determining a roll angle in response to a roll angle.

10 158. A method as recited in claim 139 wherein determining a roll angle comprises determining a roll angle in response to a reference roll angle.

15 159. A method as recited in claim 139 wherein determining a roll angle comprises determining a roll angle in response to a relative roll angle.

20 160. A method as recited in claim 139 wherein determining a roll angle comprises determining a roll angle in response to a road bank angle and a previous roll angle estimate.

25 161. A method as recited in claim 139 wherein determining a roll angle comprises determining a roll angle in response to a road bank angle and a reference roll angle.

30 162. A method as recited in claim 139 wherein determining a roll angle comprises determining a roll angle in response to a body roll angle initialization.

163. A method as recited in claim 162 wherein the body roll angle initialization is determined in

response to a roll angle estimate and a lateral acceleration.

164. A method as recited in claim 139 wherein
5 determining a roll angle comprises determining a roll angle in response to an instantaneous roll angle reference.

165. A method as recited in claim 164 wherein the
10 instantaneous roll angle reference is determined in response to a vehicle speed, a yaw rate and a lateral acceleration.

166. A method as recited in claim 139 wherein
15 determining a roll angle comprises determining a roll angle in response to a roll angle estimate.

167. A method as recited in claim 166 wherein the
20 roll angle estimate is determined in response to a reference roll angle and a body roll integration.

168. A method as recited in claim 139 wherein
25 determining a roll angle comprises determining a roll angle in response to a model roll angle.

169. A method as recited in claim 168 wherein the
model roll angle is determined in response to a chassis roll observer.

30 170. A method as recited in claim 139 wherein determining a roll angle comprises determining a roll angle in response to a road bank angle time constant.

171. A method as recited in claim 170 wherein the road bank angle time constant is determined in response to a steering velocity, a lateral acceleration and a vehicle speed.

172. A method as recited in claim 139 wherein determining a roll angle comprises determining a roll angle in response to body slip.

173. A method of controlling roll stability of a vehicle having a front brake and a rear brake comprising:

determining a roll condition of the vehicle; and
determining a brake pressure distribution between the front brake and the rear brake in response to the roll condition.

174. A method as recited in claim 173 wherein determining a brake pressure distribution comprises determining a right side brake force distribution by determining an amount of front right brake force and rear right brake force.

175. A method as recited in claim 173 wherein determining a brake pressure distribution comprises determining a left side brake force distribution by determining an amount of front left brake force and rear left brake force.

176. A method as recited in claim 173 wherein determining a roll condition comprises determining a lateral acceleration.

5 177. A method as recited in claim 173 wherein determining a roll condition comprises determining a lateral acceleration and a yaw rate.

10 178. A method as recited in claim 173 wherein determining a roll condition comprises determining a lateral acceleration, a vehicle speed and a yaw rate.

15 179. A method as recited in claim 173 wherein determining a roll condition comprises determining a lateral acceleration and a steering velocity.

20 180. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a roll rate.

 181. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a vehicle speed.

25 182. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a yaw rate a pitch angle.

30 183. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a pitch rate.

184. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a pitch angle.

5 185. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a global positioning system signal.

10 186. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a steering angle.

15 187. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a steering velocity.

20 188. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a wheel speed.

25 189. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a wheel normal load estimate.

30 190. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a road bank angle.

191. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a roll acceleration.

5 192. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a longitudinal acceleration.

10 193. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a roll angle.

15 194. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a reference roll angle.

20 195. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a relative roll angle.

25 196. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a road bank angle and a previous roll angle estimate.

30 197. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a road bank angle and a reference roll angle.

198. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a body roll angle initialization.

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199. A method as recited in claim 198 wherein the body roll angle initialization is determined in response to a roll angle estimate and a lateral acceleration.

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200. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to an instantaneous roll angle reference.

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201. A method as recited in claim 200 wherein the instantaneous roll angle reference is determined in response to a vehicle speed, a yaw rate and a lateral acceleration.

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202. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a roll angle estimate.

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203. A method as recited in claim 202 wherein the roll angle estimate is determined in response to a reference roll angle and a body roll integration.

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204. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a roll angle estimate.

205. A method as recited in claim 204 wherein the roll angle estimate is determined in response to a reference roll angle and a body roll integration.

5 206. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a model roll angle.

10 207. A method as recited in claim 206 wherein the model roll angle is determined in response to a chassis roll observer.

15 208. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to a road bank angle time constant.

20 209. A method as recited in claim 208 wherein the road bank angle time constant is determined in response to a steering velocity, a lateral acceleration and a vehicle speed.

25 210. A method as recited in claim 173 wherein determining a roll condition comprises determining a roll condition in response to body slip.

211. A method of controlling roll stability of a vehicle comprising the steps of:

30 determining a roll angle estimate; and
applying a brake pressure distribution in response to the roll angle estimate to prevent the vehicle from rolling over.

212. A method as recited in claim 211 determining a roll angle estimate comprises determining a roll angle estimate in response to a lateral acceleration.

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213. A method as recited in claim 211 determining a roll angle estimate comprises determining a roll angle estimate in response to a lateral acceleration and a yaw rate.

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214. A method as recited in claim 211 determining a roll angle estimate comprises determining a roll angle estimate in response to a lateral acceleration, a vehicle speed and a yaw rate.

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215. A method as recited in claim 211 wherein determining a roll angle estimate comprises determining a lateral acceleration and a steering velocity.

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216. A method as recited in claim 211 determining a roll angle estimate comprises determining a roll angle estimate in response to a roll rate.

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217. A method as recited in claim 211 determining a roll angle estimate comprises determining a roll angle estimate in response to a vehicle speed.

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218. A method as recited in claim 211 determining a roll angle estimate comprises determining a roll angle estimate in response to a yaw rate a pitch angle.

219. A method as recited in claim 211 determining a roll angle estimate comprises determining a roll angle estimate in response to a pitch rate.

5 220. A method as recited in claim 211 determining a roll angle estimate comprises determining a roll angle estimate in response to a pitch angle.

10 221. A method as recited in claim 211 determining a roll angle estimate comprises determining a roll angle estimate in response to a global positioning system signal.

15 222. A method as recited in claim 211 determining a roll angle estimate comprises determining a roll angle estimate in response to a steering angle.

20 223. A method as recited in claim 211 determining a roll angle estimate comprises determining a roll angle estimate in response to a steering velocity.

25 224. A method as recited in claim 211 determining a roll angle estimate comprises determining a roll angle estimate in response to a wheel speed.

30 225. A method as recited in claim 211 determining a roll angle estimate comprises determining a roll angle estimate in response to a wheel normal load estimate.

226. A method as recited in claim 211 determining a roll angle estimate comprises determining a roll angle estimate in response to a road bank angle.

5 227. A method as recited in claim 211 determining a roll angle estimate comprises determining a roll angle estimate in response to a roll acceleration.

10 228. A method as recited in claim 211 determining a roll angle estimate comprises determining a roll angle estimate in response to a longitudinal acceleration.

15 229. A method as recited in claim 211 wherein determining a roll angle estimate comprises determining a roll angle estimate in response to a reference roll angle.

20 230. A method as recited in claim 211 wherein determining a roll angle estimate comprises determining a roll angle estimate in response to a relative roll angle.

25 231. A method as recited in claim 211 wherein determining a roll angle estimate comprises determining a roll angle estimate in response to a road bank angle and a previous roll angle estimate.

30 232. A method as recited in claim 211 wherein determining a roll angle estimate comprises determining a roll angle estimate in response to a road bank angle and a reference roll angle.

233. A method as recited in claim 211 wherein
determining a roll angle estimate comprises determining
a roll angle estimate in response to a body roll angle
5 initialization.

234. A method as recited in claim 233 wherein the
body roll angle initialization is determined in
response to a lateral acceleration.
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235. A method as recited in claim 211 wherein
determining a roll angle estimate comprises determining
a roll angle estimate in response to an instantaneous
roll angle reference.
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236. A method as recited in claim 235 wherein the
instantaneous roll angle reference is determined in
response to a vehicle speed, a yaw rate and a lateral
acceleration.
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237. A method as recited in claim 211 wherein the
roll angle estimate is determined in response to a
reference roll angle and a body roll integration.

238. A method as recited in claim 211 wherein
determining a roll angle estimate comprises determining
a roll angle in response to a model roll angle.
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239. A method as recited in claim 238 wherein the
30 model roll angle is determined in response to a chassis
roll observer.

240. A method as recited in claim 211 wherein determining a roll angle estimate comprises determining a roll angle estimate in response to a road bank angle time constant.

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241. A method as recited in claim 240 wherein the road bank angle time constant is determined in response to a steering velocity, a lateral acceleration and a vehicle speed.

10

242. A method as recited in claim 211 wherein determining a roll angle estimate comprises determining a roll angle estimate in response to body slip.

15

243. A method of controlling roll stability of a vehicle comprising the steps of:

determining a roll responsive control signal; and
applying a brake pressure distribution in response to the roll responsive control signal to prevent the vehicle from rolling over.

20

244. A method as recited in claim 243 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a lateral acceleration.

25

245. A method as recited in claim 243 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a lateral acceleration and a yaw rate.

30

246. A method as recited in claim 243 wherein
determining a roll responsive control signal comprises
determining a roll responsive control signal in
response to a lateral acceleration, a vehicle speed and
5 a yaw rate.

247. A method as recited in claim 243 wherein
determining a roll responsive control signal comprises
determining a lateral acceleration and a steering
10 velocity.

248. A method as recited in claim 243 wherein
determining a roll responsive control signal comprises
determining a roll responsive control signal in
15 response to a lateral acceleration, a vehicle speed and
a yaw rate.

249. A method as recited in claim 243 wherein
determining a roll responsive control signal comprises
20 determining a roll responsive control signal in
response to a roll rate.

250. A method as recited in claim 243 wherein
determining a roll responsive control signal comprises
25 determining a roll responsive control signal in
response to a vehicle speed.

251. A method as recited in claim 243 wherein
determining a roll responsive control signal comprises
30 determining a roll responsive control signal in
response to a yaw rate a pitch angle.

252. A method as recited in claim 243 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a pitch rate.

5

253. A method as recited in claim 243 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a pitch angle.

10

254. A method as recited in claim 243 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a global positioning system signal.

15

255. A method as recited in claim 243 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a steering angle.

20

256. A method as recited in claim 243 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a steering velocity.

25

257. A method as recited in claim 243 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a wheel speed.

30

258. A method as recited in claim 243 wherein determining a roll responsive control signal comprises

determining a roll responsive control signal in response to a wheel normal load estimate.

259. A method as recited in claim 243 wherein
5 determining a roll responsive control signal comprises determining a roll responsive control signal in response to a road bank angle.

260. A method as recited in claim 243 wherein
10 determining a roll responsive control signal comprises determining a roll responsive control signal in response to a roll acceleration.

261. A method as recited in claim 243 wherein
15 determining a roll responsive control signal comprises determining a roll responsive control signal in response to a longitudinal acceleration.

262. A method as recited in claim 243 wherein
20 determining a roll responsive control signal comprises determining a roll responsive control signal in response to a roll angle.

263. A method as recited in claim 243 wherein
25 determining a roll responsive control signal comprises determining a roll responsive control signal in response to a reference roll angle.

264. A method as recited in claim 243 wherein
30 determining a roll responsive control signal comprises determining a roll responsive control signal in response to a relative roll angle.

265. A method as recited in claim 243 wherein
determining a roll responsive control signal comprises
determining a roll responsive control signal in
5 response to a road bank angle and a previous roll angle
estimate.

266. A method as recited in claim 243 wherein
determining a roll responsive control signal comprises
10 determining a roll responsive control signal in
response to a road bank angle and a reference roll
angle.

267. A method as recited in claim 243 wherein
15 determining a roll responsive control signal comprises
determining a roll responsive control signal in
response to a body roll angle initialization.

268. A method as recited in claim 267 wherein the
20 body roll angle initialization is determined in
response to a roll angle estimate and a lateral
acceleration.

269. A method as recited in claim 243 wherein
25 determining a roll responsive control signal comprises
determining a roll responsive control signal in
response to an instantaneous roll angle reference.

270. A method as recited in claim 269 wherein the
30 instantaneous roll angle reference is determined in
response to a vehicle speed, a yaw rate and a lateral
acceleration.

271. A method as recited in claim 243 wherein the roll responsive control signal is determined in response to a reference roll angle and a body roll
5 integration.

272. A method as recited in claim 243 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in
10 response to a roll angle estimate.

273. A method as recited in claim 243 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in
15 response to a model roll angle.

274. A method as recited in claim 273 wherein the model roll responsive control signal is determined in response to a chassis roll observer.
20

275. A method as recited in claim 243 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a road bank angle time constant.
25

276. A method as recited in claim 275 wherein the road bank angle time constant is determined in response to a steering velocity, a lateral acceleration and a vehicle speed.
30

277. A method as recited in claim 243 wherein the roll responsive control signal is determined in response to body slip.

5 278. A method of controlling roll stability of a vehicle comprising the steps of:
determining a vehicle roll condition; and
applying a brake pressure distribution in response to the vehicle roll condition to prevent the vehicle
10 from rolling over.

279. A method as recited in claim 278 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a
15 lateral acceleration.

280. A method as recited in claim 278 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a
20 lateral acceleration and a yaw rate.

281. A method as recited in claim 278 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a
25 lateral acceleration, a vehicle speed and a yaw rate.

282. A method as recited in claim 278 wherein determining a vehicle roll condition comprises determining a lateral acceleration and a steering
30 velocity.

283. A method as recited in claim 278 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a roll rate.

5

284. A method as recited in claim 278 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a vehicle speed.

10

285. A method as recited in claim 278 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a yaw rate a pitch angle.

15

286. A method as recited in claim 278 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a pitch rate.

20

287. A method as recited in claim 278 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a pitch angle.

25

288. A method as recited in claim 278 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a global positioning system signal.

30

289. A method as recited in claim 278 wherein determining a vehicle roll condition comprises

determining a vehicle roll condition in response to a steering angle.

290. A method as recited in claim 278 wherein
5 determining a vehicle roll condition comprises determining a vehicle roll condition in response to a steering velocity.

291. A method as recited in claim 278 wherein
10 determining a vehicle roll condition comprises determining a vehicle roll condition in response to a wheel speed.

292. A method as recited in claim 278 wherein
15 determining a vehicle roll condition comprises determining a vehicle roll condition in response to a wheel normal load estimate.

293. A method as recited in claim 278 wherein
20 determining a vehicle roll condition comprises determining a vehicle roll condition in response to a road bank angle.

294. A method as recited in claim 278 wherein
25 determining a vehicle roll condition comprises determining a vehicle roll condition in response to a roll acceleration.

295. A method as recited in claim 278 wherein
30 determining a vehicle roll condition comprises determining a vehicle roll condition in response to a longitudinal acceleration.

296. A method as recited in claim 278 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
5 roll angle.

297. A method as recited in claim 278 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
10 reference roll angle.

298. A method as recited in claim 278 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
15 relative roll angle.

299. A method as recited in claim 278 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
20 road bank angle and a previous roll angle estimate.

300. A method as recited in claim 278 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
25 road bank angle and a reference roll angle.

301. A method as recited in claim 278 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
30 body roll angle initialization.

302. A method as recited in claim 301 wherein the body roll angle initialization is determined in response to a roll angle estimate and a lateral acceleration.

5

303. A method as recited in claim 278 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to an instantaneous roll angle reference.

10

304. A method as recited in claim 303 wherein the instantaneous roll angle reference is determined in response to a vehicle speed, a yaw rate and a lateral acceleration.

15

305. A method as recited in claim 278 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a roll angle estimate.

20

306. A method as recited in claim 305 wherein the roll angle estimate is determined in response to a reference roll angle and a body roll integration.

25

307. A method as recited in claim 278 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a model roll angle.

30

308. A method as recited in claim 307 wherein the model roll angle is determined in response to a chassis roll observer.

309. A method as recited in claim 278 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
5 road bank angle time constant.

310. A method as recited in claim 309 wherein the
road bank angle time constant is determined in response
to a steering velocity, a lateral acceleration and a
10 vehicle speed.

311. A method as recited in claim 278 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to
15 body slip.

312. A method of controlling roll stability of a
vehicle comprising the steps of:
determining a roll angle of the vehicle; and
20 reducing a tire force vector in response to roll
angle to prevent the vehicle from rolling over.

313. A method as recited in claim 312 wherein
determining a roll angle comprises determining a roll
25 angle in response to a lateral acceleration.

314. A method as recited in claim 312 determining
a roll angle comprises determining a roll angle in
response to a lateral acceleration and yaw rate.

30

315. A method as recited in claim 312 determining
a roll angle comprises determining a roll angle in

response to a lateral acceleration, yaw rate vehicle speed.

316. A method as recited in claim 312 wherein
5 determining a roll angle comprises determining a lateral acceleration and a steering velocity.

317. A method as recited in claim 312 wherein
10 determining a roll angle comprises determining a roll angle in response to a roll rate.

318. A method as recited in claim 312 wherein
15 determining a roll angle comprises determining a roll angle in response to a vehicle speed.

319. A method as recited in claim 312 wherein
determining a roll angle comprises determining a roll angle in response to a yaw rate a pitch angle.

20 320. A method as recited in claim 312 wherein determining a roll angle comprises determining a roll angle in response to a pitch rate.

321. A method as recited in claim 312 wherein
25 determining a roll angle comprises determining a roll angle in response to a pitch angle.

322. A method as recited in claim 312 wherein
30 determining a roll angle comprises determining a roll angle in response to a global positioning system signal.

323. A method as recited in claim 312 wherein determining a roll angle comprises determining a roll angle in response to a steering angle.

5 324. A method as recited in claim 312 wherein determining a roll angle comprises determining a roll angle in response to a steering velocity.

10 325. A method as recited in claim 312 wherein determining a roll angle comprises determining a roll angle in response to a wheel speed.

15 326. A method as recited in claim 312 wherein determining a roll angle comprises determining a roll angle in response to a wheel normal load estimate.

20 327. A method as recited in claim 312 wherein determining a roll angle comprises determining a roll angle in response to a road bank angle.

328. A method as recited in claim 312 wherein determining a roll angle comprises determining a roll angle in response to a roll acceleration.

25 329. A method as recited in claim 312 wherein determining a roll angle comprises determining a roll angle in response to a longitudinal acceleration.

30 330. A method as recited in claim 312 wherein determining a roll angle comprises determining a roll angle in response to a reference roll angle.

331. A method as recited in claim 312 wherein determining a roll angle comprises determining a roll angle in response to a relative roll angle.

5 332. A method as recited in claim 312 wherein determining a roll angle comprises determining a roll angle in response to a road bank angle and a previous roll angle estimate.

10 333. A method as recited in claim 312 wherein determining a roll angle comprises determining a roll angle in response to a road bank angle and a reference roll angle.

15 334. A method as recited in claim 312 wherein determining a roll angle comprises determining a roll angle in response to a body roll angle initialization.

20 335. A method as recited in claim 334 wherein the body roll angle initialization is determined in response to a roll angle estimate and a lateral acceleration.

25 336. A method as recited in claim 312 wherein determining a roll angle comprises determining a roll angle in response to an instantaneous roll angle reference.

30 337. A method as recited in claim 336 wherein the instantaneous roll angle reference is determined in response to a vehicle speed, a yaw rate and a lateral acceleration.

338. A method as recited in claim 312 wherein determining a roll angle comprises determining a roll angle in response to a roll angle estimate.

5

339. A method as recited in claim 338 wherein the roll angle estimate is determined in response to a reference roll angle and a body roll integration.

10

340. A method as recited in claim 312 wherein determining a roll angle comprises determining a roll angle in response to a model roll angle.

15

341. A method as recited in claim 340 wherein the model roll angle is determined in response to a chassis roll observer.

20

342. A method as recited in claim 312 wherein determining a roll angle comprises determining a roll angle in response to a road bank angle time constant.

25

343. A method as recited in claim 342 wherein the road bank angle time constant is determined in response to a steering velocity, a lateral acceleration and a vehicle speed.

30

344. A method as recited in claim 312 wherein determining a roll angle comprises determining a roll angle in response to body slip.

345. A method of controlling roll stability of a vehicle comprising the steps of:

determining a roll angle estimate; and
reducing a tire force vector in response to roll
angle estimate to prevent the vehicle from rolling
over.

5

346. A method as recited in claim 345 determining
a roll angle comprises determining a roll angle
estimate in response to a lateral acceleration.

10

347. A method as recited in claim 345 determining
a roll angle estimate comprises determining a roll
angle estimate in response to a lateral acceleration
and a yaw rate.

15

348. A method as recited in claim 345 determining
a roll angle estimate comprises determining a roll
angle estimate in response to a lateral acceleration, a
vehicle speed and a yaw rate.

20

349. A method as recited in claim 345 wherein
determining a roll angle estimate comprises determining
a lateral acceleration and a steering velocity.

25

350. A method as recited in claim 345 determining
a roll angle estimate comprises determining a roll
angle estimate in response to a roll rate.

30

351. A method as recited in claim 345 determining
a roll angle estimate comprises determining a roll
angle estimate in response to a vehicle speed.

352. A method as recited in claim 345 determining a roll angle estimate comprises determining a roll angle estimate in response to a yaw rate a pitch angle.

5 353. A method as recited in claim 345 determining a roll angle estimate comprises determining a roll angle estimate in response to a pitch rate.

10 354. A method as recited in claim 345 determining a roll angle estimate comprises determining a roll angle estimate in response to a pitch angle.

15 355. A method as recited in claim 345 determining a roll angle estimate comprises determining a roll angle estimate in response to a global positioning system signal.

20 356. A method as recited in claim 345 determining a roll angle estimate comprises determining a roll angle estimate in response to a steering angle.

25 357. A method as recited in claim 345 determining a roll angle estimate comprises determining a roll angle estimate in response to a steering velocity.

358. A method as recited in claim 345 determining a roll angle estimate comprises determining a roll angle estimate in response to a wheel speed.

30 359. A method as recited in claim 345 determining a roll angle estimate comprises determining a roll

angle estimate in response to a wheel normal load estimate.

360. A method as recited in claim 345 determining
5 a roll angle estimate comprises determining a roll angle estimate in response to a road bank angle.

361. A method as recited in claim 345 determining
a roll angle estimate comprises determining a roll
10 angle estimate in response to a roll acceleration.

362. A method as recited in claim 345 determining
a roll angle estimate comprises determining a roll
angle estimate in response to a longitudinal
15 acceleration.

363. A method as recited in claim 345 wherein
determining a roll angle estimate comprises determining
a roll angle estimate in response to a reference roll
20 angle.

364. A method as recited in claim 345 wherein
determining a roll angle estimate comprises determining
a roll angle estimate in response to a relative roll
25 angle.

365. A method as recited in claim 345 wherein
determining a roll angle estimate comprises determining
a roll angle estimate in response to a road bank angle
30 and a previous roll angle estimate.

366. A method as recited in claim 345 wherein determining a roll angle estimate comprises determining a roll angle estimate in response to a road bank angle and a reference roll angle.

5

367. A method as recited in claim 345 wherein determining a roll angle estimate comprises determining a roll angle estimate in response to a body roll angle initialization.

10

368. A method as recited in claim 345 wherein the body roll angle initialization is determined in response to a lateral acceleration.

15

369. A method as recited in claim 345 wherein determining a roll angle estimate comprises determining a roll angle estimate in response to an instantaneous roll angle reference.

20

370. A method as recited in claim 369 wherein the instantaneous roll angle reference is determined in response to a vehicle speed, a yaw rate and a lateral acceleration.

25

371. A method as recited in claim 345 wherein the roll angle estimate is determined in response to a reference roll angle and a body roll integration.

30

372. A method as recited in claim 345 wherein determining a roll angle comprises determining a roll angle in response to a model roll angle.

373. A method as recited in claim 372 wherein the model roll angle is determined in response to a chassis roll observer.

5 374. A method as recited in claim 345 wherein determining a roll angle estimate comprises determining a roll angle estimate in response to a road bank angle time constant.

10 375. A method as recited in claim 374 wherein the road bank angle time constant is determined in response to a steering velocity, a lateral acceleration and a vehicle speed.

15 376. A method as recited in claim 345 wherein determining a roll angle estimate comprises determining a roll angle estimate in response to body slip.

20 377. A method of controlling roll stability of a vehicle comprising the steps of:

 determining a roll responsive control signal;
 reducing a tire force vector in response to roll angle to prevent the vehicle from rolling over.

25 378. A method as recited in claim 377 wherein determining a roll angle comprises determining a roll responsive control signal in response to a lateral acceleration.

30 379. A method as recited in claim 377 wherein determining a roll responsive control signal comprises

determining a roll responsive control signal in response to a lateral acceleration and a yaw rate.

5 380. A method as recited in claim 377 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a lateral acceleration, a vehicle speed and a yaw rate.

10 381. A method as recited in claim 377 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a roll rate.

15 382. A method as recited in claim 377 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a vehicle speed.

20 383. A method as recited in claim 377 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a yaw rate a pitch angle.

25 384. A method as recited in claim 377 wherein determining a roll responsive control signal comprises determining a roll responsive control signal in response to a pitch rate.

30 385. A method as recited in claim 377 wherein determining a roll responsive control signal comprises

determining a roll responsive control signal in response to a pitch angle.

386. A method as recited in claim 377 wherein
5 determining a roll responsive control signal comprises determining a roll responsive control signal in response to a global positioning system signal.

387. A method as recited in claim 377 wherein
10 determining a roll responsive control signal comprises determining a roll responsive control signal in response to a steering angle.

388. A method as recited in claim 377 wherein
15 determining a roll responsive control signal comprises determining a roll responsive control signal in response to a steering velocity.

389. A method as recited in claim 377 wherein
20 determining a roll responsive control signal comprises determining a roll responsive control signal in response to a wheel speed.

390. A method as recited in claim 377 wherein
25 determining a roll responsive control signal comprises determining a roll responsive control signal in response to a wheel normal load estimate.

391. A method as recited in claim 377 wherein
30 determining a roll responsive control signal comprises determining a roll responsive control signal in response to a road bank angle.

392. A method as recited in claim 377 wherein
determining a roll responsive control signal comprises
determining a roll responsive control signal in
5 response to a roll acceleration.

393. A method as recited in claim 377 wherein
determining a roll responsive control signal comprises
determining a roll responsive control signal in
10 response to a longitudinal acceleration.

394. A method as recited in claim 377 wherein
determining a roll responsive control signal comprises
determining a roll responsive control signal in
15 response to a roll angle.

395. A method as recited in claim 377 wherein
determining a roll responsive control signal comprises
determining a roll responsive control signal in
20 response to a reference roll angle.

396. A method as recited in claim 377 wherein
determining a roll responsive control signal comprises
determining a roll responsive control signal in
25 response to a relative roll angle.

397. A method as recited in claim 377 wherein
determining a roll responsive control signal comprises
determining a roll responsive control signal in
30 response to a road bank angle and a previous roll angle
estimate.

398. A method as recited in claim 377 wherein
determining a roll responsive control signal comprises
determining a roll responsive control signal in
response to a road bank angle and a reference roll
5 angle.

399. A method as recited in claim 377 wherein
determining a roll responsive control signal comprises
determining a roll responsive control signal in
10 response to a body roll angle initialization.

400. A method as recited in claim 377 wherein
determining a roll responsive control signal comprises
determining a roll responsive control signal in
15 response to a model roll angle.

401. A method as recited in claim 400 wherein the
model roll responsive control signal is determined in
response to a chassis roll observer.

20 402. A method as recited in claim 377 wherein
determining a roll responsive control signal comprises
determining a roll responsive control signal in
response to a road bank angle time constant.

25 403. A method as recited in claim 402 wherein the
road bank angle time constant is determined in response
to a steering velocity, a lateral acceleration and a
vehicle speed.

30 404. A method as recited in claim 377 wherein
determining a roll responsive control signal comprises

determining a roll responsive control signal in response to body slip.

405. A method of controlling roll stability of a vehicle comprising the steps of:

determining a vehicle roll condition; and

reducing a tire force vector in response to the vehicle roll condition to prevent the vehicle from rolling over.

10

406. A method as recited in claim 405 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a lateral acceleration.

15

407. A method as recited in claim 405 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a lateral acceleration and a yaw rate.

20

408. A method as recited in claim 405 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a lateral acceleration, a vehicle speed and a yaw rate.

25

409. A method as recited in claim 405 wherein determining a vehicle roll condition comprises determining a lateral acceleration and a steering velocity.

30

410. A method as recited in claim 405 wherein determining a vehicle roll condition comprises

determining a vehicle roll condition in response to a roll rate.

411. A method as recited in claim 405 wherein
5 determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
vehicle speed.

412. A method as recited in claim 405 wherein
10 determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
yaw rate a pitch angle.

413. A method as recited in claim 405 wherein
15 determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
pitch rate.

414. A method as recited in claim 405 wherein
20 determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
pitch angle.

415. A method as recited in claim 405 wherein
25 determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
global positioning system signal.

416. A method as recited in claim 405 wherein
30 determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
steering angle.

417. A method as recited in claim 405 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
5 steering velocity.

418. A method as recited in claim 405 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
10 wheel speed.

419. A method as recited in claim 405 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
15 wheel normal load estimate.

420. A method as recited in claim 405 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
20 road bank angle.

421. A method as recited in claim 405 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
25 roll acceleration.

422. A method as recited in claim 405 wherein
determining a vehicle roll condition comprises
determining a vehicle roll condition in response to a
30 longitudinal acceleration.

423. A method as recited in claim 405 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a roll angle.

5

424. A method as recited in claim 405 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a reference roll angle.

10

425. A method as recited in claim 405 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a relative roll angle.

15

426. A method as recited in claim 405 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a road bank angle and a previous roll angle estimate.

20

427. A method as recited in claim 405 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a road bank angle and a reference roll angle.

25

428. A method as recited in claim 405 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a body roll angle initialization.

30

429. A method as recited in claim 428 wherein the body roll angle initialization is determined in

response to a roll angle estimate and a lateral acceleration.

430. A method as recited in claim 405 wherein
5 determining a vehicle roll condition comprises determining a vehicle roll condition in response to an instantaneous roll angle reference.

431. A method as recited in claim 430 wherein the
10 instantaneous roll angle reference is determined in response to a vehicle speed, a yaw rate and a lateral acceleration.

432. A method as recited in claim 405 wherein
15 determining a vehicle roll condition comprises determining a vehicle roll condition in response to a roll angle estimate.

433. A method as recited in claim 405 wherein the
20 roll angle estimate is determined in response to a reference roll angle and a body roll integration.

434. A method as recited in claim 405 wherein
25 determining a vehicle roll condition comprises determining a vehicle roll condition in response to a model roll angle.

435. A method as recited in claim 434 wherein the
30 model roll angle is determined in response to a chassis roll observer.

436. A method as recited in claim 405 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to a road bank angle time constant.

5

437. A method as recited in claim 436 wherein the road bank angle time constant is determined in response to a steering velocity, a lateral acceleration and a vehicle speed.

10

438. A method as recited in claim 405 wherein determining a vehicle roll condition comprises determining a vehicle roll condition in response to body slip.

15

439. A rollover control system for an automotive vehicle having a steering system and a brake system comprising:

20 a roll condition sensor producing a rollover signal in response to an impending rollover; and

a controller apportioning an amount of correction provided by the steering system and the and brake system to prevent the vehicle from rolling over.

25

440. A system as recited in claim 439 wherein the roll condition sensor comprises a lateral acceleration sensor.

30

441. A system as recited in claim 439 wherein the roll condition sensor comprises a lateral acceleration sensor and a yaw rate sensor.

442. A system as recited in claim 439 wherein the roll condition sensor comprises a lateral acceleration sensor, a yaw rate sensor and a vehicle speed sensor.

5 443. A system as recited in claim 439 wherein the roll condition sensor comprises a lateral acceleration sensor and steering velocity sensor.

10 444. A system as recited in claim 439 wherein the roll condition sensor comprises a roll rate sensor.

445. A system as recited in claim 439 wherein the roll condition sensor comprises a vehicle speed sensor.

15 446. A system as recited in claim 439 wherein the roll condition sensor comprises a yaw rate sensor and a pitch angle sensor.

20 447. A system as recited in claim 439 wherein the roll condition sensor comprises a pitch rate sensor.

448. A system as recited in claim 439 wherein the roll condition sensor comprises a pitch angle sensor.

25 449. A system as recited in claim 439 wherein the roll condition sensor comprises a global positioning system.

30 450. A system as recited in claim 439 wherein the roll condition sensor comprises a steering angle sensor.

451. A system as recited in claim 439 wherein the roll condition sensor comprises a steering velocity sensor.

5 452. A system as recited in claim 439 wherein the roll condition sensor comprises a wheel speed sensor.

10 453. A system as recited in claim 439 wherein the roll condition sensor comprises wheel normal load sensor.

15 454. A system as recited in claim 439 wherein the roll condition sensor comprises a roll acceleration sensor.

20 455. A system as recited in claim 439 wherein the roll condition sensor comprises a longitudinal acceleration.

25 456. A system as recited in claim 439 wherein the roll condition sensor comprises a roll angle.

30 457. A system as recited in claim 439 wherein the roll condition sensor comprises a vehicle speed sensor, a yaw rate sensor and a lateral acceleration sensor.

35 458. A system as recited in claim 439 wherein the roll condition sensor comprises a chassis roll observer.

40 459. A system as recited in claim 439 wherein the roll condition sensor comprises a suspension sensor.

460. A system as recited in claim 439 wherein the roll condition sensor comprises a body slip sensor.

5 461. A system as recited in claim 439 wherein the roll condition sensor comprises a bank angle sensor.

462. A method of controlling roll stability of a vehicle having a brake system and a steering system
10 comprising:

 determining a roll condition of the vehicle in response to an impending rollover; and

 apportioning an amount of correction provided by the steering system and the brake system to prevent the
15 vehicle from rolling over.

463. A method as recited in claim 462 wherein determining a roll condition comprises determining a lateral acceleration.
20

464. A method as recited in claim 462 wherein determining a roll condition comprises determining a lateral acceleration and a yaw rate.

25 465. A method as recited in claim 462 wherein determining a roll condition comprises determining a lateral acceleration, a vehicle speed and a yaw rate.

466. A method as recited in claim 462 wherein
30 determining a roll condition comprises determining a lateral acceleration and a steering velocity.

467. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to a roll rate.

5 468. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to a vehicle speed.

10 469. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to a yaw rate a pitch angle.

15 470. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to a pitch rate.

20 471. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to a pitch angle.

25 472. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to a global positioning system signal.

30 473. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to a steering angle.

30 474. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to a steering velocity.

475. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to a wheel speed.

5

476. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to a wheel normal load estimate.

10

477. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to a road bank angle.

15

478. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to a roll acceleration.

479. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to a longitudinal acceleration.

480. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to a roll angle.

481. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to a reference roll angle.

30

482. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to a relative roll angle.

5 483. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to a road bank angle and a previous roll angle estimate.

10 484. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to a road bank angle and a reference roll angle.

15 485. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to a body roll angle initialization.

20 486. A method as recited in claim 485 wherein the body roll angle initialization is determined in response to a roll angle estimate and a lateral acceleration.

25 487. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to an instantaneous roll angle reference.

30 488. A method as recited in claim 487 wherein the instantaneous roll angle reference is determined in

response to a vehicle speed, a yaw rate and a lateral acceleration.

489. A method as recited in claim 462 wherein
5 determining a roll condition comprises determining a
roll condition in response to a roll angle estimate.

490. A method as recited in claim 489 wherein the
roll angle estimate is determined in response to a
10 reference roll angle and a body roll integration.

491. A method as recited in claim 462 wherein
determining a roll condition comprises determining a
roll condition in response to a roll angle estimate.
15

492. A method as recited in claim 491 wherein the
roll angle estimate is determined in response to a
reference roll angle and a body roll integration.

20 493. A method as recited in claim 462 wherein
determining a roll condition comprises determining a
roll condition in response to a model roll angle.

494. A method as recited in claim 493 wherein the
25 model roll angle is determined in response to a chassis
roll observer.

495. A method as recited in claim 462 wherein
determining a roll condition comprises determining a
30 roll condition in response to a road bank angle time
constant.

496. A method as recited in claim 495 wherein the road bank angle time constant is determined in response to a steering velocity, a lateral acceleration and a vehicle speed.

5

497. A method as recited in claim 462 wherein determining a roll condition comprises determining a roll condition in response to body slip.

10 498. A rollover control system for an automotive vehicle having a front brake and a rear brake comprising:

a roll condition sensor producing a roll condition signal in response to an impending rollover; and

15 a controller proportioning brake pressures between a front brake and rear brake in response to the roll condition signal to prevent the vehicle from rolling over.

20 499. A system as recited in claim 498 wherein the roll condition sensor comprises a lateral acceleration sensor.

25 500. A system as recited in claim 498 wherein the roll condition sensor comprises a lateral acceleration sensor and a yaw rate sensor.

30 501. A system as recited in claim 498 wherein the roll condition sensor comprises a lateral acceleration sensor and steering velocity sensor.

502. A system as recited in claim 498 wherein the roll condition sensor comprises a roll rate sensor.

503. A system as recited in claim 498 wherein the
5 roll condition sensor comprises a vehicle speed sensor.

504. A system as recited in claim 498 wherein the roll condition sensor comprises a yaw rate sensor and a pitch angle sensor.

10

505. A system as recited in claim 498 wherein the roll condition sensor comprises a pitch rate sensor.

506. A system as recited in claim 498 wherein the
15 roll condition sensor comprises a pitch angle sensor.

507. A system as recited in claim 498 wherein the roll condition sensor comprises a global positioning system.

20

508. A system as recited in claim 498 wherein the roll condition sensor comprises a steering angle sensor.

25 509. A system as recited in claim 498 wherein the roll condition sensor comprises a steering velocity sensor.

510. A system as recited in claim 498 wherein the
30 roll condition sensor comprises a wheel speed sensor.

511. A system as recited in claim 498 wherein the roll condition sensor comprises wheel normal load sensor.

5 512. A system as recited in claim 498 wherein the roll condition sensor comprises a roll acceleration sensor.

10 513. A system as recited in claim 498 wherein the roll condition sensor comprises a longitudinal acceleration.

514. A system as recited in claim 498 wherein the roll condition sensor comprises a roll angle.

15

515. A system as recited in claim 498 wherein the roll condition sensor comprises a vehicle speed sensor, a yaw rate sensor and a lateral acceleration sensor.

20 516. A system as recited in claim 498 wherein the roll condition sensor comprises a chassis roll observer.

25 517. A system as recited in claim 498 wherein the roll condition sensor comprises a suspension sensor.

518. A system as recited in claim 498 wherein the roll condition sensor comprises a body slip sensor.

30 519. A system as recited in claim 498 wherein the roll condition sensor comprises a bank angle sensor.

520. A method of controlling a rollover control system for an automotive vehicle having a front brake and a rear brake comprising:

5 determining a roll condition signal in response to an impending rollover; and

proportioning brake pressures between a front brake and a rear brake in response to the roll condition signal to prevent the vehicle from rolling over.

10

521. A method as recited in claim 520 wherein determining a roll condition comprises determining a lateral acceleration.

15

522. A method as recited in claim 520 wherein determining a roll condition comprises determining a lateral acceleration and a yaw rate.

20

523. A method as recited in claim 520 wherein determining a roll condition comprises determining a lateral acceleration, a vehicle speed and a yaw rate.

25

524. A method as recited in claim 520 wherein determining a roll condition comprises determining a lateral acceleration and a steering velocity.

30

525. A method as recited in claim 520 wherein determining a roll condition comprises determining a roll condition in response to a roll rate.

526. A method as recited in claim 520 wherein determining a roll condition comprises determining a roll condition in response to a vehicle speed.

5 527. A method as recited in claim 520 wherein determining a roll condition comprises determining a roll condition in response to a yaw rate a pitch angle.

10 528. A method as recited in claim 520 wherein determining a roll condition comprises determining a roll condition in response to a pitch rate.

15 529. A method as recited in claim 520 wherein determining a roll condition comprises determining a roll condition in response to a pitch angle.

20 530. A method as recited in claim 520 wherein determining a roll condition comprises determining a roll condition in response to a global positioning system signal.

25 531. A method as recited in claim 520 wherein determining a roll condition comprises determining a roll condition in response to a steering angle.

532. A method as recited in claim 520 wherein determining a roll condition comprises determining a roll condition in response to a steering velocity.

30 533. A method as recited in claim 520 wherein determining a roll condition comprises determining a roll condition in response to a wheel speed.

534. A method as recited in claim 520 wherein
determining a roll condition comprises determining a
roll condition in response to a wheel normal load
5 estimate.

535. A method as recited in claim 520 wherein
determining a roll condition comprises determining a
roll condition in response to a road bank angle.
10

536. A method as recited in claim 520 wherein
determining a roll condition comprises determining a
roll condition in response to a roll acceleration.

537. A method as recited in claim 520 wherein
determining a roll condition comprises determining a
roll condition in response to a longitudinal
15 acceleration.

538. A method as recited in claim 520 wherein
determining a roll condition comprises determining a
roll condition in response to a roll angle.
20

539. A method as recited in claim 520 wherein
25 determining a roll condition comprises determining a
roll condition in response to a reference roll angle.

540. A method as recited in claim 520 wherein
determining a roll condition comprises determining a
30 roll condition in response to a relative roll angle.

541. A method as recited in claim 520 wherein determining a roll condition comprises determining a roll condition in response to a road bank angle and a previous roll angle estimate.

5

542. A method as recited in claim 520 wherein determining a roll condition comprises determining a roll condition in response to a road bank angle and a reference roll angle.

10

543. A method as recited in claim 520 wherein determining a roll condition comprises determining a roll condition in response to a body roll angle initialization.

15

544. A method as recited in claim 543 wherein the body roll angle initialization is determined in response to a roll angle estimate and a lateral acceleration.

20

545. A method as recited in claim 520 wherein determining a roll condition comprises determining a roll condition in response to an instantaneous roll angle reference.

25

546. A method as recited in claim 545 wherein the instantaneous roll angle reference is determined in response to a vehicle speed, a yaw rate and a lateral acceleration.

30

547. A method as recited in claim 520 wherein determining a roll condition comprises determining a roll condition in response to a roll angle estimate.

5 548. A method as recited in claim 547 wherein the roll angle estimate is determined in response to a reference roll angle and a body roll integration.

10 549. A method as recited in claim 520 wherein determining a roll condition comprises determining a roll condition in response to a roll angle estimate.

15 550. A method as recited in claim 549 wherein the roll angle estimate is determined in response to a reference roll angle and a body roll integration.

20 551. A method as recited in claim 520 wherein determining a roll condition comprises determining a roll condition in response to a model roll angle.

552. A method as recited in claim 551 wherein the model roll angle is determined in response to a chassis roll observer.

25 553. A method as recited in claim 520 wherein determining a roll condition comprises determining a roll condition in response to a road bank angle time constant.

30 554. A method as recited in claim 553 wherein the road bank angle time constant is determined in response

to a steering velocity, a lateral acceleration and a vehicle speed.

555. A method as recited in claim 520 wherein
5 determining a roll condition comprises determining a roll condition in response to body slip.

556. A rollover control system for an automotive vehicle traveling a path having a front brake and a
10 rear brake comprising:

a roll condition sensor producing a roll condition signal in response to an impending rollover; and

a controller balancing braking pressures between the front brake and the rear brake in response to the
15 roll condition signal to minimize induced vehicle yaw or minimize induced path deviation.

557. A system as recited in claim 556 wherein the roll condition sensor comprises a lateral acceleration
20 sensor.

558. A system as recited in claim 556 wherein the roll condition sensor comprises a lateral acceleration sensor and a yaw rate sensor.
25

559. A system as recited in claim 556 wherein the roll condition sensor comprises a lateral acceleration sensor, a vehicle speed sensor and a yaw rate sensor.

30 560. A system as recited in claim 556 wherein the roll condition sensor comprises a lateral acceleration sensor and steering velocity sensor.

561. A system as recited in claim 556 wherein the roll condition sensor comprises a roll rate sensor.

5 562. A system as recited in claim 556 wherein the roll condition sensor comprises a vehicle speed sensor.

563. A system as recited in claim 556 wherein the roll condition sensor comprises a yaw rate sensor and a
10 pitch angle sensor.

564. A system as recited in claim 556 wherein the roll condition sensor comprises a pitch rate sensor.

15 565. A system as recited in claim 556 wherein the roll condition sensor comprises a pitch angle sensor.

566. A system as recited in claim 556 wherein the roll condition sensor comprises a global positioning
20 system.

567. A system as recited in claim 556 wherein the roll condition sensor comprises a steering angle
25 sensor.

568. A system as recited in claim 556 wherein the roll condition sensor comprises a steering velocity
sensor.

30 569. A system as recited in claim 556 wherein the roll condition sensor comprises a wheel speed sensor.

570. A system as recited in claim 556 wherein the roll condition sensor comprises wheel normal load sensor.

5 571. A system as recited in claim 556 wherein the roll condition sensor comprises a roll acceleration sensor.

572. A system as recited in claim 556 wherein the
10 roll condition sensor comprises a longitudinal acceleration.

573. A system as recited in claim 556 wherein the roll condition sensor comprises a roll angle.

15

574. A system as recited in claim 556 wherein the roll condition sensor comprises a chassis roll observer.

20 575. A system as recited in claim 556 wherein the roll condition sensor comprises a suspension sensor.

576. A system as recited in claim 556 wherein the roll condition sensor comprises a body slip sensor.

25

577. A system as recited in claim 556 wherein the roll condition sensor comprises a bank angle sensor.

578. A method of controlling a rollover control
30 system for an automotive vehicle traveling a path having a front brake and a rear brake comprising:

determining a roll condition signal in response to an impending rollover; and

balancing braking pressures between the front brake and the rear brake in response to the roll condition signal to minimize induced vehicle yaw or
5 minimize induced path deviation.

579. A method as recited in claim 578 wherein determining a roll condition comprises determining a
10 lateral acceleration.

580. A method as recited in claim 578 wherein determining a roll condition comprises determining a lateral acceleration and a yaw rate.
15

581. A method as recited in claim 578 wherein determining a roll condition comprises determining a lateral acceleration, a vehicle speed and a yaw rate.

20 582. A method as recited in claim 578 wherein determining a roll condition comprises determining a lateral acceleration and a steering velocity.

583. A method as recited in claim 578 wherein
25 determining a roll condition comprises determining a roll condition in response to a roll rate.

584. A method as recited in claim 578 wherein
30 determining a roll condition comprises determining a roll condition in response to a vehicle speed.

585. A method as recited in claim 578 wherein determining a roll condition comprises determining a roll condition in response to a yaw rate a pitch angle.

5 586. A method as recited in claim 578 wherein determining a roll condition comprises determining a roll condition in response to a pitch rate.

10 587. A method as recited in claim 578 wherein determining a roll condition comprises determining a roll condition in response to a pitch angle.

15 588. A method as recited in claim 578 wherein determining a roll condition comprises determining a roll condition in response to a global positioning system signal.

20 589. A method as recited in claim 578 wherein determining a roll condition comprises determining a roll condition in response to a steering angle.

25 590. A method as recited in claim 578 wherein determining a roll condition comprises determining a roll condition in response to a steering velocity.

591. A method as recited in claim 578 wherein determining a roll condition comprises determining a roll condition in response to a wheel speed.

30 592. A method as recited in claim 578 wherein determining a roll condition comprises determining a

roll condition in response to a wheel normal load estimate.

593. A method as recited in claim 578 wherein
5 determining a roll condition comprises determining a
roll condition in response to a road bank angle.

594. A method as recited in claim 578 wherein
determining a roll condition comprises determining a
10 roll condition in response to a roll acceleration.

595. A method as recited in claim 578 wherein
determining a roll condition comprises determining a
roll condition in response to a longitudinal
15 acceleration.

596. A method as recited in claim 578 wherein
determining a roll condition comprises determining a
roll condition in response to a roll angle.

20

597. A method as recited in claim 578 wherein
determining a roll condition comprises determining a
roll condition in response to a reference roll angle.

25

598. A method as recited in claim 578 wherein
determining a roll condition comprises determining a
roll condition in response to a relative roll angle.

500. A method as recited in claim 578 wherein
30 determining a roll condition comprises determining a
roll condition in response to a road bank angle and a
previous roll angle estimate.

600. A method as recited in claim 578 wherein
determining a roll condition comprises determining a
roll condition in response to a road bank angle and a
5 reference roll angle.

601. A method as recited in claim 578 wherein
determining a roll condition comprises determining a
roll condition in response to a body roll angle
10 initialization.

602. A method as recited in claim 601 wherein the
body roll angle initialization is determined in
response to a roll angle estimate and a lateral
15 acceleration.

603. A method as recited in claim 578 wherein
determining a roll condition comprises determining a
roll condition in response to an instantaneous roll
20 angle reference.

604. A method as recited in claim 603 wherein the
instantaneous roll angle reference is determined in
response to a vehicle speed, a yaw rate and a lateral
25 acceleration.

605. A method as recited in claim 578 wherein
determining a roll condition comprises determining a
roll condition in response to a roll angle estimate.

30

606. A method as recited in claim 605 wherein the roll angle estimate is determined in response to a reference roll angle and a body roll integration.

5 607. A method as recited in claim 578 wherein determining a roll condition comprises determining a roll condition in response to a roll angle estimate.

10 608. A method as recited in claim 607 wherein the roll angle estimate is determined in response to a reference roll angle and a body roll integration.

15 609. A method as recited in claim 578 wherein determining a roll condition comprises determining a roll condition in response to a model roll angle.

20 610. A method as recited in claim 609 wherein the model roll angle is determined in response to a chassis roll observer.

25 611. A method as recited in claim 578 wherein determining a roll condition comprises determining a roll condition in response to a road bank angle time constant.

30 612. A method as recited in claim 611 wherein the road bank angle time constant is determined in response to a steering velocity, a lateral acceleration and a vehicle speed.

613. A method as recited in claim 578 wherein determining a roll condition comprises determining a roll condition in response to body slip.

5 614. A rollover control system for an automotive vehicle having a brake system with a brake pedal comprising:

 a dynamic control system generating a dynamic control brake signal;

10 a roll condition sensor producing a roll condition signal in response to an impending rollover;

 a controller proportioning brake pressures in response to the roll condition signal, pressure by a driver on the brake pedal and the dynamic control brake
15 signal to prevent the vehicle from rolling over.

615. A system as recited in claim 614 wherein the dynamic control system comprises a yaw control system.

20 616. A system as recited in claim 614 wherein said controller proportions a front brake pressure and a rear brake pressure.

 617. A system as recited in claim 614 wherein the
25 roll condition sensor comprises a lateral acceleration sensor.

 618. A system as recited in claim 614 wherein the
roll condition sensor comprises a lateral acceleration
30 sensor and a yaw rate sensor.

619. A system as recited in claim 614 wherein the roll condition sensor comprises a lateral acceleration sensor and steering velocity sensor.

5 620. A system as recited in claim 614 wherein the roll condition sensor comprises a roll rate sensor.

621. A system as recited in claim 614 wherein the roll condition sensor comprises a vehicle speed sensor.

10

622. A system as recited in claim 614 wherein the roll condition sensor comprises a yaw rate sensor and a pitch angle sensor.

15

623. A system as recited in claim 614 wherein the roll condition sensor comprises a pitch rate sensor.

624. A system as recited in claim 614 wherein the roll condition sensor comprises a pitch angle sensor.

20

625. A system as recited in claim 614 wherein the roll condition sensor comprises a global positioning system.

25

626. A system as recited in claim 614 wherein the roll condition sensor comprises a steering angle sensor.

30

627. A system as recited in claim 614 wherein the roll condition sensor comprises a steering velocity sensor.

628. A system as recited in claim 614 wherein the roll condition sensor comprises a wheel speed sensor.

629. A system as recited in claim 614 wherein the
5 roll condition sensor comprises wheel normal load sensor.

630. A system as recited in claim 614 wherein the
10 roll condition sensor comprises a roll acceleration sensor.

631. A system as recited in claim 614 wherein the
roll condition sensor comprises a longitudinal
acceleration.

15 632. A system as recited in claim 614 wherein the
roll condition sensor comprises a roll angle.

633. A system as recited in claim 614 wherein the
20 roll condition sensor comprises a vehicle speed sensor,
a yaw rate sensor and a lateral acceleration sensor.

634. A system as recited in claim 614 wherein the
roll condition sensor comprises a chassis roll
25 observer.

635. A system as recited in claim 614 wherein the
roll condition sensor comprises a suspension sensor.

30 636. A system as recited in claim 614 wherein the
roll condition sensor comprises a body slip sensor.

637. A system as recited in claim 614 wherein the roll condition sensor comprises a bank angle sensor.